EPA/ESD/R10-92/900
1992

EPA Superfund
Explanation of Significant Differences:

COMMENCEMENT BAY, NEAR SHORE/TIDE FLATS
EPA ID: WAD980726368
OU 23
PIERCE COUNTY, WA
11/01/1991

EXPLANATION OF SIGNIFICANT DIFFERENCES

Site Name and Location:

Tacoma Tar Pits - Commencement Bay Nearshore Tideflats
Tacoma, Washington

Lead and Support Agencies:

U.S. Environmental Protection Agency (EPA)
Washington Department of Ecology (Ecology)

Laws that require an Explanation of Significant Differences (ESD):

Comprehensive Environmental Response, Compensation and Liability Act (CERCLA)
Section 117 (c), as amended by the 1986 Superfund Amendments and Reauthorization Act, and National Oil and Hazardous Substances Pollution Contingency Plan (NCP), Section 300.435(c)(2)(i)

Need and Purpose for an ESD:

On December 30, 1987, EPA signed a Record of Decision (ROD) for the Tacoma Tar Pits (Tar Pits), which is located within the Commencement Bay Superfund site. As part of the remediation approach required by the ROD treatability studies were conducted and evaluated to determine stabilization processes which wouls be effective for the contaminants at this site.

Further, additional studies were conducted subsequent to the ROD during remedial design (RD) 1) to determine the extent of contamination (EOC), 2) physical and chemical properties of the constituents, and 3) estimate the dilution and attenuation factors (DAF) at this site. Based upon information obtained from these studies, a number of changes to the remedy have been developed which, while significant enough to warrant this ESD, do not fundamentally alter the basic features of the remedy selected in the ROD. Further, these changes to the remedial approach have been incorporated into a proposed Consent Decree lodged in federal district Court in Tacoma on October 4, 1991. The Consent Decree, between the EPA and Washington Natural Gas Company (WNG), a responsible party for the site, requires WNG to implement remediation at this site.

This document presents the changes and describes the differences in relation to the ROD.

The differences from the ROD include:

1. Consolidation of additional contaminated soils (hot spots) from peripheral areas, and stabilization of these soils in the ROD cap areas.

2. Consolidation of contaminated soils (hot spots) from the Joseph Simon & Sons (Simon) Operating Area East (designated as “Area C” in the EOC), and stabilization of such soils in the ROD cap area.

3. Importation of clean fill to backfill all excavated areas and to place treated tars, soils, and auto-fluff above the seasonally high water table.

4. Modification of stabilizing mixes for the specific chemical and physical properties of each zone of contamination. The following three treatment areas or zones have been established for the site:

    a. Tar Ponds, Tar Pits and Boils;

    b. Soils; and

    c. Auto-fluff

    These areas are designated in the map of the site attached to the ESD.

5. The leaching requirements and treatment levels necessary to meet post-remediation clean up criteria established in the 1987 ROD, will be modified to take into consideration the final Batch Plant Demonstration Report, the final DAF Report, available bench scale treatment data, and attenuation characteristics.

6. The total cubic yards of soil to be treated is now expected to be in excess of the 45,000 cubic yards originally anticipated in the ROD. The estimated volume of material presently scheduled to be stabilized is approximately 78,600 cubic yards.

7. The ROD estimated a low permiability cap area of approximately 75,000 square yards as shown on the map which is Figure 8 in the ROD (Attached). That area will still be stabilized and covered with a low permeability cap. However, the capped area will be expanded to include an additional surface area up to a total of approximately 100,000 square yards. The capped area will include all of the Simon operating area.

8. The capital cost for remedial action has increased from the $3.4 million estimate in the ROD. Increases in volume of material to be treated, cost of stabilization ingredients, area to be capped, and engineering/management costs have raised by a factor of five the projected cost of remediation. The current estimated cost of the remediation is $15-18 million.

9. The current scheduled projects the site to be remediated in 2 years but allows a third year for unforeseen contingencies.

While the hazardous waste management approach differs from the ROD in the above respects, it does not fundamentally alter the remedy. This approach will continue to be protective of human health and environment, and is consistent with the NCP.

Administrative Record:

The ESD will become part of the Administrative Record for the Tar Pits site, and this Record is available at the following two locations:

U.S. Environmental Protection Agency
1200 Sixth Avenue, HW-113
Seattle, Washington 98101

Tacoma Public Library
Main Branch
1102 Tacoma Avenue, N.W. Room
Tacoma, Washington 98402

Site Background

A coal gasification plant constructed in 1924 operated at this site until 1956. Waste material from the coal gasification process were disposed of on-site. These materials included coal tar liquors, coal ash, and coal tars. The waste compounds include aromatic hydrocarbons, (e.g., benzene, toluene,) polynuclear aromatic hydrocarbons (PAHs) (e.g., napthalene,

benzo(a)pyrene), as well as numerous other classes of hydrocarbons and cyanide. Heavy metals including arsenic, mercury and lead are also common in such waste streams. In 1966, WNG, the site owner, concluded demolition of the plant. Most structures were removed but some demolition debris and below grade structures were left in place. Such structures included tanks and pipelines containing tars. In 1967, Simon began a metal recycling operation at the site. The Simon operation including recycling of a variety of metals, including car bodies and electrical transformers. The scraping of these products introduced heavy metals, polychlorinated byphenyls (PCBs) and shredded non-metal automobile waste known as auto fluff into the local environment. The auto fluff, which is comprised of mostly shredded automobile interiors, was used as fill material at the southern perimeter of the Simon property and other surrounding property owned by Burlington Northern Railroad Company (BN) and Hygrade Foods Product Corporation (Hygrade).

In 1981, evidence of contamination was observed by EPA and the Washington Department of Ecology (Ecology). Tar with PAH content of 4% (40,000 milligrams per kilogram) was noted. In 1982 the EPA Field Investigation Team conducted an inspection of the site leading to an EPA Potential Hazardous Waste Site Preliminary Assessment. In September of 1984, EPA began a Remedial Investigation (RI) which, in November of 1984 as part of an Administrative Order on Consent, was assumed by Simon, WNG, Hygrade, and BN. In 1987, the RI, and subsequent Risk Assessment, and Feasibility Study (FS) were completed by these parties.

Addendums to the RI, FS and Risk Assessment reports were prepared by EPA, with assistance from Ecology, to identify issues that were not fully addressed by those reports. Such issues included the further investigation of the nature and extent of soil contamination, a more complete understanding of the site hydrogeologic systems, and identification of stabilization processes adequate for site specific conditions. The ROD requires bench and pilot treatability studies as part of the solution leading to remediation of the site.

In September 1988, EPA issued an Unilaterial Administrative Order (UAO) to WNG and Simon requiring these parties to implement the remedial action selected in the ROD.

EPA, with assistance from Ecology, has provided oversight of the WNG and Simon remedial activities. In 1991, as a result of an alleged failure of these parties to fully comply with the UAO, EPA filed a law suit in Federal District court to enforce the requirements of the UAO.

Remedy Selected in the ROD:

In November 1987, EPA held a public meeting and provided an opportunity for comments on the proposed selected remedy. A responsiveness summary was prepared to respond to the public comments received by EPA. The comments and responses were incorporated into the ROD. The responsiveness summary is attached to the ROD, which is included in the Administrative Record.

The ROD addressed, source control, of on-site contamination through excavation of contaminated soils and stabilization of these contaminated soils in a polymer/cement matrix. The stabilized matrix was to be capped to reduce rain and surface-water infiltration.

At the time of the ROD, groundwater extraction and treatment was not deemed necessary. On-site shallow groundwater contains detectable concentrations of contaminants in excess of applicable or relevant and appropriate standards (ARARS). The stabilization, capping and surface water management are expected to prevent further migration of contamination. Should ongoing or further groundwater monitoring indicate contamination migration after remediation, further remedial actions may be necessary to address the shallow groundwater contamination.

The remedial activities required by the ROD include:

- Excavation and treatment of all contaminated soils considered to be Extremely Hazardous Wastes (EHW), which is defined for this site as exceeding 1 per cent (10,000 ppm) total polynuclear aromatic hydrocarbon (Ecology ARAR);

- Excavation and treatment (stabilization) of all surface soils (less than 3 ft. depth) containing contaminants that exceed a 10^{-6} lifetime cancer risk level;

- Reduction of surface water infiltration and potential human exposure to stabilized soils by capping the stabilized matrix with low permeability asphalt cap;

- Reduction of surface water transport of contaminants by channeling and managing surface water run-on and run-off;

- Provision for continued groundwater monitoring to evaluate the effectiveness of the remedial action and to evaluate the need for potential groundwater extraction and treatment;

- Removal and treatment of ponded water to achieve cleanup goals; and

- Provision for institutional controls to assure cap integrity and prevention of future use of contaminated on-site groundwater.

"Treatment will be sufficient to reduce contaminant levels in the soils, and surface waters to or below cleanup standards. Numeric values for these cleanup standards and the criteria used in performance standard development are presented in Table 1. Treatment should be permanent, and should effectively reduce the toxicity and mobility of the contaminants. Performance levels are not to be exceeded during the operational life of remedial the remedial action." ROD 1987

Although Table 1 in the ROD (attached) contains cleanup standards for the contaminants of concern (lead, PCBs, PAHs, and Benzene) for groundwater, the remedial action does not currently provide for groundwater extraction treatment. Source control measures are expected to reduce contaminant concentrations in the local groundwater system. Groundwater monitoring performed during implementation of and following remedial action will aid in determining the effectiveness of the remedial action. If cleanup levels in groundwater are not achieved (in the aquifers) at the site boundary within a reasonable period of time (as determined by the Q-SUM method described in the Management Plan May, 1990, EBASCO) following completion of the remedial action, and a subsequent 2 year monitoring period, an alternative remedial action will be evaluated and implemented which may include groundwater extraction and treatment.

Continued monitoring of surface waters will also be performed to ensure cleanup levels are met during and following implementation of the remedial action. Surface water discharge shall at all times be of quality consistent with Federal and Washington State laws.

Institutional controls, including deed restrictions and prohibitions against excavation or drilling, consistent with the final design will assure that the remedial action will be protective of human health and the environment.

The effectiveness and performance of the final remedial action will be reassessed at regular intervals, not to exceed 5 years.

Significant Differences and Basis for Them

As part of the settlement of legal issues, WNG prepared a document titled “Framework for Remediation” (Framework) dated September 23, 1991 (Dalton, Omstead & Fuglevand, Inc., 1991). This document describes the plans for remediation and the basis for each operable unit of the site. The Framework will be made part of the future work plans for the remedy and is included in the Administrative Record. Those parties wishing to examine the Framework have full access to the document.

1. Consolidation of Hotspots from the Peripheral Areas

The EOC investigation. was conducted in, April, 1990, and, the Report was issued in August, 1990. The purpose of that investigation was to determine the nature and extent of additional contamination beyond the proposed cap area delineated in the ROD. From this report, it was shown that various levels of contamination of the criteria compounds existed in the peripheral areas of the site (shown on the attached map, EXHIBIT 2, as A1, A2, B1, B2, D1, D2, D3 and D4). Based on the data contained in EOC, and the historical evaluation of the site, it was determined that most cost effective method for remediation, which would still be protective of human health and the environment, and remain consistent with the December 1987 ROD was “hot spot” removal and treatment. It was concluded that if the most contaminated soils were removed from the peripheral areas and replaced by clean fill, the remaining contamination would be below ROD action levels (Based on 10^{-6} risk) and thus be protective of human health and the environment. It was further concluded that capping the peripheral areas would be unnecessary. Therefore, the peripheral areas listed above will be remediated as set forth below.

Contaminated soils will be excavated, consolidated and be stabilized within the proposed ROD cap area. Concentration of soils contaminants in peripheral areas

will not exceed the ROD criteria values based upon the geometric means for lead and the arithmetic average for PCBs, PAHs and benzene. THe Washington Model Toxics Control Act list soil cleanup levels for industrial soil. Method A levels are listed at WAC 173-340-745 (7)(e)(ii). Consistent with MTCA the maximusoil concetration will not exceed two times the Method A level for Industrial soil. Soils will be intially excavated from the areas shown on the attached map. After excavation, sampling and analysis will be conducted to confirm clean up or provide direction for additional excavation needed to meet the above criteria. The details showing locations, depths and pre and post-remediation averages is shown in Exhibits 3 and 4 of the Framework. The remediation criteria are set to reduce health risks via soil ingestion and inhalation pathways as addressed in the Risk Assessment and are consistent with the remedy contained in the ROD.

It is expected that by reducing the contaminant concentration of benzene, lead, PAHs and PCBs, in soil, should result in the groundwater criteria being met at the perimeter monitoring wells. Benzene is the most mobile contaminant of concern. Since benzene concentrations in the peripheral areas are low it can be reasonably anticipated that protection of groundwater will be achieved by this remedy. A detailed discussion of the groundwater issues are contained in Appendiz A of the Framework.

2. <u>Consolidation and Stabilizing of Area C, Simons Operating East</u>

This area contains most of buildings and processing equipment used by Simon as part of its scrap metal recycling business. This area was not originally anticipated in the ROD to require remediation. However, the EOC report indicated the presence of contaminated soils in this area.

Remediation in this area will be similar to that of the peripheral areas in that “hot spots” will be excavated, consolidated, and stabilized within the ROD cap area.

There are two major differences in the remidiation for this zone. First, only the most contaminated soils will be removed from the operating area. This is based upon considerations in developing an action level which is reflective of the incremental change in average

contaminant concentrations, the incremental environmental benefit versus the incremental cost, the relative mobility of the contaminants, and the projected capping of this area. As the discussion in Appendix B of the Framework points out, the cost benefit and protectiveness issues were reviewed in development of the present “Hot Spot” Action levels. Graphs B5 through B10 show decline in average contaminant concentration and decline in the 90% frequency interval versus volume of soil to be excavated and associated cost. The graphs illustrate the “break points” for the various contaminants where further incremental reduction in average concentration or 90% frequency interval would require substantial increases in the volume of soil to be excavated. From that analysis, costs increases can be estimated. For example, the PCB maximum concentration is reduced 98% at 50 mg/kg action level. Using the 25 mg/kg action level requires a doubling of the soil volume to be treated to achieve a 99% reduction in the maximum concentration. The resultant cost is directly proportioned to the volume of material treated. The incremental reduction. The net benefit in consideration of the low mobility of the contaminant, PCB, and the plan to cover this area, favor the (50 mg/kg) action level. The excavation action criteria for “hot spots” are as follows:

- Lead > 4000 mg/kg
- PCBs > 50 mg/kg
- PAHs > 113 mg/kg

It is important to note, that using the above excavation criteria results in substantial reduction of contamination levels of the listed contaminants. From exhibit B-4 of the framework, the following are the estimated resutant contamination levels after excavation.

Estimated soil concentrations after excavation of hot spots in Area C in Parts per Million.

	ARITHMETIC MEAN	GEOMETRIC MEAN	MAX CONC.	UPPER 90%
LEAD		46	3720	501
PCB	1.3		31	2.6
PAHS	12		113	46

Second, this area will be capped after hot spot excavation, which will effectively eliminate the potential for soil ingestion and inhalation (the primary exposure pathways of concern). Benzene will be reduced along with remediation of the above chemicals to the ROD criteria.

The operating area will be capped with a low permeability material that is suitable for the day-to-day business activities being conducted on the site. This serves to satisfy the ROD by excavating and treating the most contaminated material for groundwater protection and by eliminating direct exposure and inhalation pathway to protect human health.

The excavation and sampling activity will be the same as for the peripheral areas in that confirmatory sampling or additional excavation will be conducted until the action criterial are met. Additional internodal sampling locations beyond those sampled during the EOC activities will be tested to better define the areal extent and reduce potential for missing “hot spots” in the soil area between existing structures. Clean fill will be used to backfill excavated areas, and the low permeability cap will be integrated into the site drainage system.

It is projected that through excavation, consolidation, and treatment, the resulting reduction of contaminated soil concentrations of ROD parameters will reduce the potential of observing these chemicals in the perimeter monitoring wells. The groundwater will be further protected by the capping and integration of a surface water drainage system. Further detailed discussion are contained in the Framework.

3. <u>Importation of Clean Fill to place Treated Material above the seasonally high water table.</u>

Imported clean fill will be placed in the area designated as the proposed cap. It is in this area

that material consolidated from peripheral “hot spot” excavations will be stabilized with existing tars, soils, or auto fluff. This area will be excavated to a depth of 3 feet and media stabilized. Fill material will be placed in the excavation to raise the bottom of the excavation to the nominal high water level expected after remediation of the site. This will improve drainage patterns of the site and will serve to reduce the potential of the below-ground leaching of contaminants of the stabilized matrix to groundwater. The area will be capped with a low permeability cover as outlined in the ROD.

4. Modification of Treatability Mixes

The ROD envisioned a cement/polymer mix added to a somewhat homogenous combination of soil, auto fluff and tar to produce a stabilized matrix. Bench and pilot (Batch plant) scale studies have been conducted to demonstrate the effectiveness of the process. Review of the information has suggested that not all contaminants will require the same level of treatment in order to reduce their mobility, availability, or solubility and meet cleanup criteria for groundwater at the site boundary. Another consideration is the sequencing for the remediation across the site to minimize disruption to the Simons operation and to maximize the use of mobilized equipment.

These considerations have led to a plan for stabilizing, in three major groups, contaminated areas having three distinctly different chemical compositions. Accordingly, it is anticipated that there will be different mixes for each of the predominant components; one for auto fluff, one for tarry materials, and one for soils.

5. Change in the Leaching Requirements

Maximum values for the leaching characteristic have been established for each of the parameters using information obtained in the DAF report (EBASCO, 1991), data from the bench scale report, batch scale reports and information in the framework document.

For the ponds and Tar Pit and Boil areas the following are the maximum leaching values:

Permeability	–	less than 10-7 cm/s
Unconfined Compressive Strength	–	minimum 50 psi
Durability	–	less than 5% loss of mass or dimensional stability
Leachability	–	Lead 650 ug/l PCBs 2.6 ug/l ROD PAHs (total) 390 ug/l ROD PAHs (individual) 65 ug/l Benzene 500 ug/l

For auto-fluff* and soils the following are the physical values and maximum leaching values:

Unconfined Compressive Strength	–	minimum 50 psi
Leachability	–	Lead 5000 ug/l PCBs 20 ug/l ROD PAHs (total) 3000 ug/l ROD PAHs (individual) 500 ug/l Benzene 500 ug/l

*Auto-fluff does not have an unconfined compressive strength requirement.

Additional treatability testing at both bench and batch scales will be conducted to further optimize mix constituents. The 1987 ROD cleanup goals for groundwater still provide the site boundary requirements, but final leaching standards will be determined based upon the results of testing, the final DAF report, and consideration of attenuation characteristics. The maximum values that have been established provide protectiveness to meet the groundwater criteria at the site boundary monitoring wells. As stated in the ROD, source control measures are expected to reduce contaminant concentrations in the local groundwater system. Groundwater monitoring performed during implementation and following the remedial action will aid in determining the effectiveness of the remedial

action. If cleanup levels are not achieved at the site boundary in the aquifers within a reasonable period of time following completion of remedial action and the subsequent 2 year monitoring period, and alternative remedial action will be evaluated and implemented which may include groundwater extraction."

As comtemplated in the ROD, an expanded groungwater monitoring system has been designed and installed. Pre-remediation groundwater quality data is currently being collected.

Groundwater and surface water data will continue to be collected after the remediation is complete. Data collected after the Ponds and Tar Pit/Boil Areas have been remediated will be used to assess whether exceedances of ROD criteria have occurred, trends in the monitoring data, and whether additional remedial action is warranted.

6. Increase in the Volume of Material to be Treated

The ROD estimated 45,000 cubic yards of material would be treated and stabilized at the site. This estimate assumed "areas of clean" within the proposed cap boundary, and did not account for additional contaminated material in the peripheral or Simon operating Area C. Testing of the site within the cap area, and the data from the EOC report have produced a new estimate of soil, auto-fluff, and tar of approximately 78,600 cubic yards. This amount may increase as additional testing is implemented during the excavation of "hot spots," or as EHW tarry materials are observed.

7. Increase in Cap Area

The ROD describes an estimated area for the cap of 75,000 square yards. This is shown in Figure 8 of the ROD. (Attached). The major change in total cap area is due to the inclusion-of all of the,Simon operating area EAST, also designated as Area C in the EOC. Inclusion of this area has been done to further reduce the exposure pathway of direct contact or inhalation and to provide additional protectiveness to the groundwater. Encapsulating the low level contamination within the active operating area accomplishes the clean-up goal in the ROD while at the same time reducing the disruption to the ongoing business concern, which was another stated goal in the ROD.

Integration of this additional area into the surface water drainage system should also serve to further reduce the infiltration of rainwater.

8. Increase in Capital Cost for Remediation

The major components affecting the cost increase are the increase in the unit cost of remediation, chemical additives, volume of material to be stabilized, the increase in the scope of capped area, and the associated increases in materials handling. The increased cost estimate is also due to an increase in the scope of additional costs for the engineering and management of the project.

For example, the ROD estimated $60 per cubic yard for stabilization. The current estimate is $150 per yard for tarry wastes at $40 per cubic yard for auto fluff, and $75 dollars per cubic yard for soils. These figures are an estimate of costs at this time. value engineering may reduce some costs, while unforseen contingencies would certainly add to the total dollar amount. The current estimate to complete the remediation at this time is $15 million, with possible cost increase to $18 million. It should be noted that while these costs have increased, the nature of the activities being conducted have not changed significantly from those envisioned in the ROD. A project cost estimate is attached to the ESD dated 10/18/91.

9. Change in Remediation Schedule

In September 1988, EPA issued the Unilateral Administrative Order (UAO) to WNG implementation of the remedy set forth in the ROD. The UAO required completion of construction of the remedial action by September 1990. The UAO was amended in June 6, 1989, with new time requirements for the interim steps leading to completion of remediation by September 26, 1991. As part of the settlement of the civil action, a new schedule has been developed and agreed to that requires remediation to be completed by November 1, 1993, with an optional third construction season to January 10, 1995.

WNG will begin construction during the summer of 1992, and has produced a plan to complete activities in phases for two construction seasons in the following manner:

Phase I - 1992. Remediation of Simon's operating areas and peripheral areas. Peripheral areas may be stockpiled to be used in remediating tarry material in Phase II.

Phase II - 1993. Remediation Ponds, Pits & Boil Area.

Phase III - 1993. Remediation of auto-fluff

Phase IV - 1994. Contingency Year

The contingency year has been established to provide additional time for unforseen events which may include weather-associated problems, discovery of more contamination, or delays in the review process.

The details of the schedule are included in the Framework. This schedule does not include construction time for groundwater treatment system. An evaluation of whether groundwater remediation will be necessary will be made 2 years after completion of the construction program. Implementation of the groundwater treatment program, including a new schedule would be developed at that time.

Support Agency Comments

Ecology has been informed of the developments in the remediation approach and has had continuous opportunity to comment on the Framework, the Scope of Work attached to the Consent Decree and this ESD. Ecology concurs with this ESD.

Affirmation of Statutory Determinations

Considering the new information developed subsequent to the ROD, and the resulting changes to the selected remedy, EPA and Ecology believe that the remedy remains protective of human health and the environment. The remedy utilizes permanent solutions to the maximum extent practicable for this site and is cost effective. It complies with the NCP and federal and state requirements identified in the ROD that are applicable or relevant and appropriate to this remedial action.

Public Participation Activities

This ESD, supporting information, and EPA's response to any comments from the public will become a part of the Administrative Record for the site. For additional information regarding this ESD, please contact the Superfund Site Manager for the Tacoma Tar Pits site:

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1200 Sixth Avenue, HW-113
Seattle, Washington 98101
(206) 553-2723

APPROVED:

Charles E. Findley, Director
Hazardous Waste Division
November 1, 1991

References

EBASCO Environmental, 1990, “Extent of Contamination Field Study,” Final Report prepared for WNG, November 1990.

EBASCO Environmental, 1990, “Tar Sampling and Volatilization Study,” Final Report prepared for WNG, September, 1990.

EBASCO Environmental, 1991, “Dilution Attenuation Factors Quanitiflication Report,” Prepared for WNG, April, 1991.

EBASCO Environmental, 1990, “Management Plan,” Prepared for WNG, May, 1990.

Dalton, Omstead & Fuglevand, Inc., 1991, “Framework for Remediation,” Prepared for WNG, September, 1991.

EPA - Record of Decision, “Remedial alternative Selection, Final Remedial Action, Commencement Bay/Nearshore Tideflats, Tacoma Tar Pits, Tacoma, Washington,” December 30, 1987.

AGI, “Remedial Investigation Report,” Tacoma Tar Pitsl September, 1987.

EBASCO Environmental, “Feasibility Study, THCGS,” July, 1987.

EBASCO Environinental, “Batch Plant Demonstration Report,” Prepared for WNG, March, 1991.

EBASCO Environmental, “Bench Scale Study Feasibility Report.” Prepared January, 1990.

EBASCO Environmental, “Risk Assessment of the THCGS,” for WDG&JSS, July, 1987.

Maximum Allowable Contaminant Concentrations

Tacoma Tar Pits Site

From 1987 ROD

Contaminant or Contaminant Class	Soils (mg/kg)	Surface Water, Boundary (ug/l)	Surface Water On-Site (ug/l)	Groundwater (sand and fill aquifers) (ug/l)
Lead	166	3.2(4)	172(7)	50(8)
Benzene	56	53(5)	5,300(7)	53(5)
PCBs	1	0.2	2	0.2
PAHs(1)	1.0(3)	5 - 30(6)	219(7)	5

(1) Included are benzo(a)pyrene, benzo(a)anthrancene, benzo(a)fluornathene, benzo(k)fluoranthene, dibenzo(a,h)anthracene, and indeno(1,2,3-c,d)pyrene.

(2) Acceptable dose.

(3) 10^{-6} Risk Level.

(4) Chronic freshwater ambient water quality criterion. Performance based on detection limit.

(5) Acute freshwater ambient water quality criterion x 1/100.

(6) Estimated range of chronic freshwater ambient water quality criterion based on marine criteria.

(7) Estimated acute freshwater ambient water quality criterion.

(8) Drinking Water MCL.

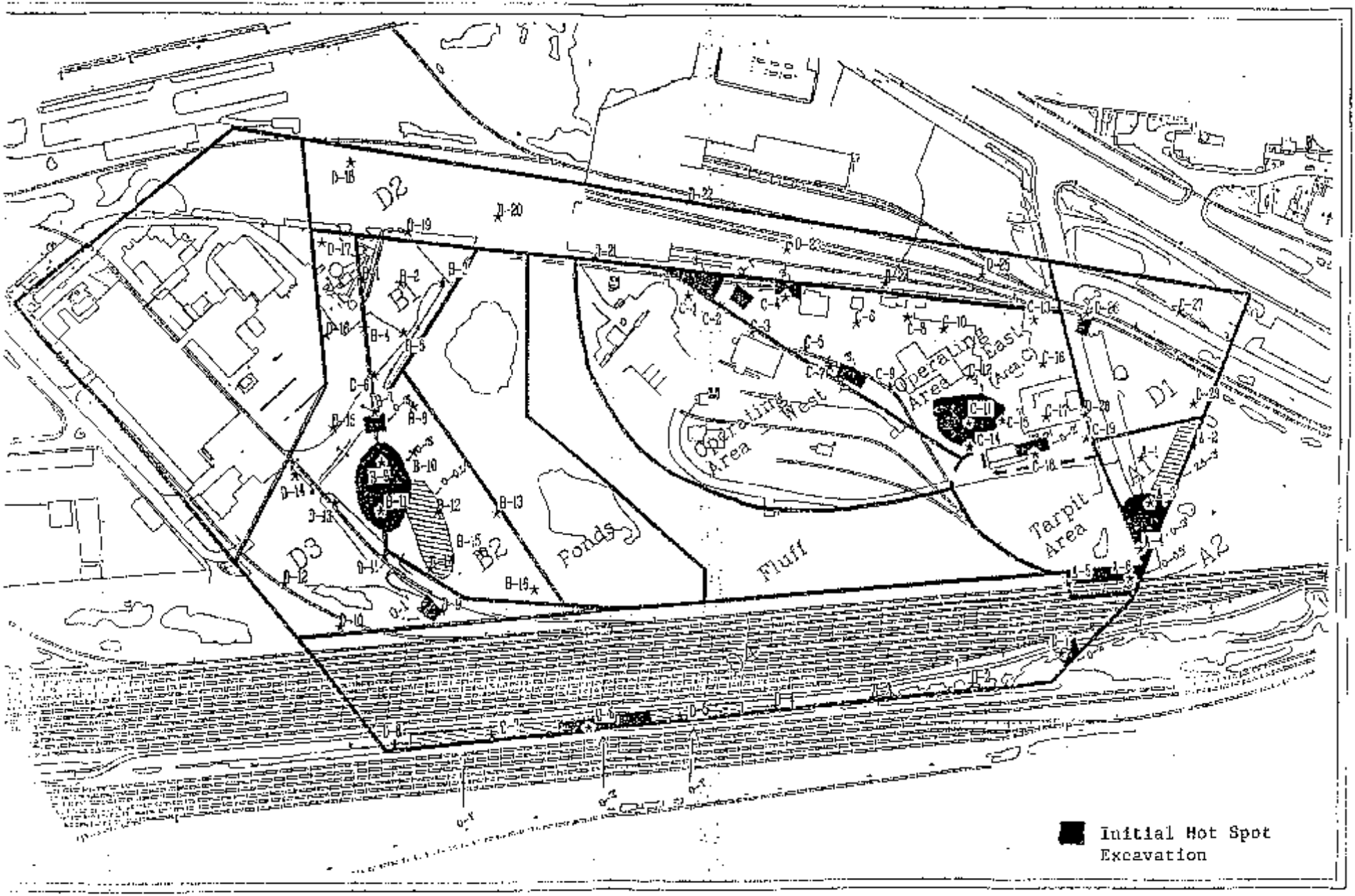
D2
B1
D3
B2
Ponds
Fluff
Operating Area West
Operating Area East (Area C)
Tarpit Area
D1
A1
A2
Initial Hot Spot Excavation

EXHIBIT 2

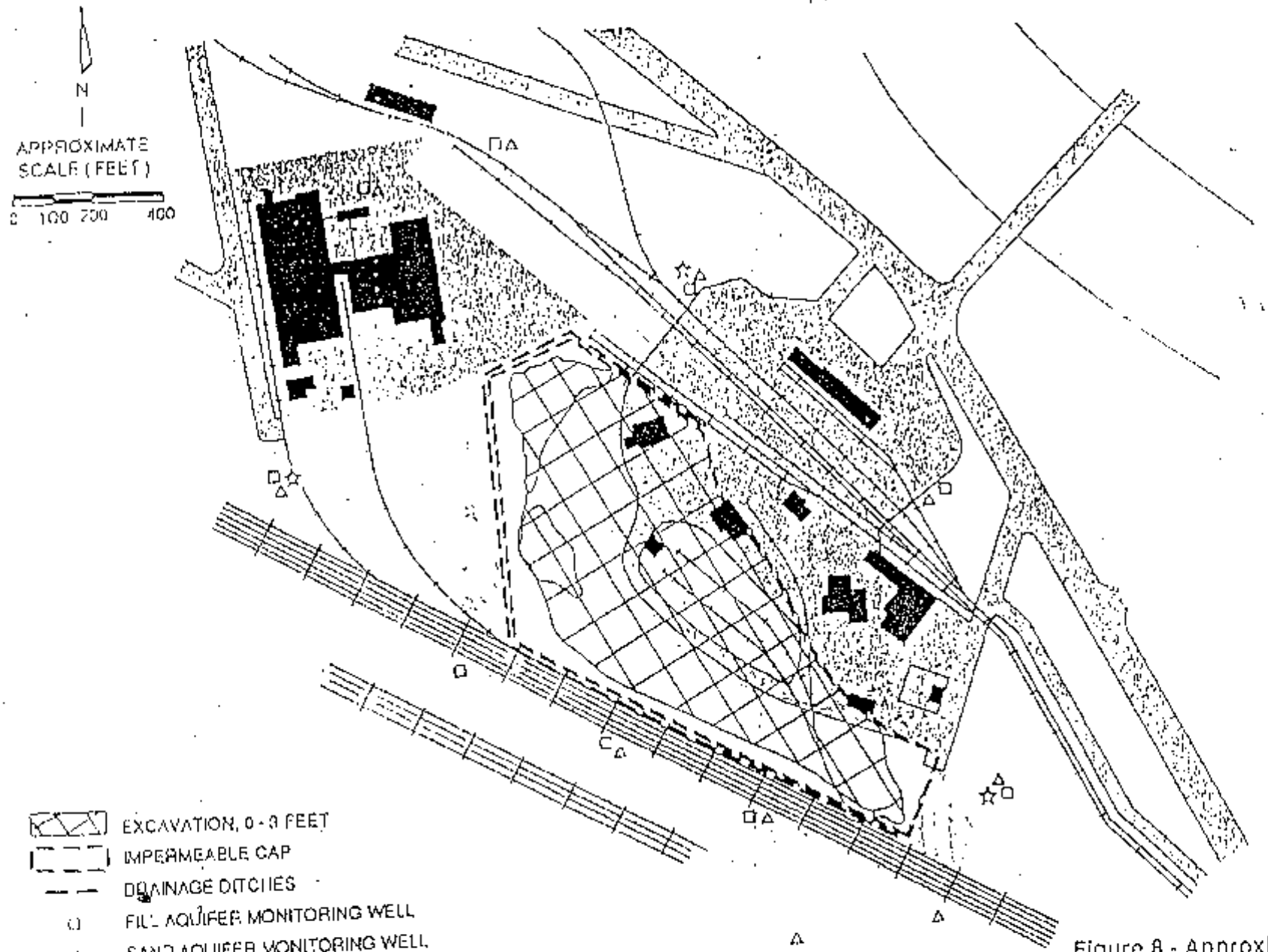

Figure 8 - Approximate Extent of Remediation

STABILIZES PONDS, TAR PIT, TAR BOIL, FLUFF, AND HOT SPOT IN AREAS A2, B2, D3 AND D4; STABILIZE OPERATING AREA, ASPHALT CAP ON OPERATING AREA AND AREA C

		PONDS & TARPITS	FLUFF	OPERATING AREA	AREA C	PERIMETER HOTSPOTS	TOTALS
SQUARE YD REMEDIATED		22915	21989	26000	22000	0	92904
CUBIC YD TO BE STABILIZED		22915	21989	26000	2500	5240	78664
DIRECT COSTS:	UNIT PRICE						
STABILIZATION OF TARRY MATL	150.0 $/CY	$3,437,250	$0	$0	$0	$0	$3,437,250
ASPHALT CAP	20.0 $/SY	$458,300	$439,780	$520,000	$440,000	$0	$1,858,080
COMPACTION	10.0 $/SY	$0	$219,890	$0	$0	$0	$219,890
EXCAVATION OF FULL	10.0 $/CY	$0	$219,890	$0	$0	$0	$219,890
STRUCTURE FILL	$ LS	$0	$200,000	$0	$25,000	$52,400	$277,400
STABILIZATION OF FLUFF	40.0 $/CY	$0	$879,560	$0	$0	$0	$879,560
STABILIZATION OF OP AREA	75.0 $/CY	$0	$0	$1,950,000	$187,500	$393,000	$2,530,500
GRADING OF OPERATING AREA	7.0 $/SY	$0	$0	$182,000	$154,000	$0	$336,000
ADDITIONAL EOC SAMPLING	$ LS	$0	$0	$80,000	$0	$0	$80,000
SITE DRAINAGE	3.2 $/SY	$73,996	$71,008	$83,958	$71,041	$0	$300,000
CITY CONNECTION	0.8 $/SY	$18,499	$17,751	$20,989	$17,760	$0	$75,000
WATER REMOVAL	$ LS	$100,000	$50,000	$0	$0	$0	$150,000
RUN OFF CONTROL	1.6 $/SY	$36,998	$35,503	$41,979	$35,521	$0	$150,000
SIMONS OP DURING CONST	$ LS	$0	$0	$300,000	$200,000	$0	$500,000
CONSTRUCTION ROAD	3.2 $/SY	$73,996	$71,006	$83,958	$71,041	$0	$300,000
DECONTAMINATION	1.6 $/SY	$36,998	$35,503	$41,979	$35,521	$0	$150,000$
H & S	1.1 $/SY	$24,665	$23,669	$27,986	$23,680	$0	$100,000
POWER POLES	$ LS	$6,000	$6,000	$0	$0	$0	$12,000
LONG TERM MON	11.2 $/SY	$257,505	$247,099	$292,173	$247,223	$0	$1,044,000
O & M (4.9/9.8)	4.9 $/SY	$112,284	$107,746	$254,800	$215,600	$0	$690,430
GROUNDWATER TRTMT	0.0 $/SY	$0	$0	$0	$0	$0	$0
CONTINGENCY	20%	$927,298	$524,880	$775,964	$344,777	$89,080	$2,662,200
SUBTOTAL DIRECT COST		$5,563,788	$3,149,282	$4,655,785	$2,068,664	$534,480	$15,972,000
INDIRECT COST:							
ENGINEERING, CM	12.0%	$667,655	$377,914	$558,694	$248,240	$64,138	$1,916,640
SALES TAX: 50% LABOR	3.9%	$216,988	$122,822	$181,578	$80,678	$20,845	$622,908
SUBTOTAL INDIRECT COST		$884,642	$500,736	$740,270	$328,918	$84,982	$2,539,548
TOTAL FOR SEGMENT		6,448,430	$3,650,018	$5,396,055	$2,397,582	$619,462	$18,511,547

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

NOV 1 1991

OFFICE OF
SOLID WASTE AND EMERGENCY RESPONSE

MEMORANDUM

SUBJECT: Explanation of Significant Differences (ESD), for the Tacoma Tar Pits, Commencement Bay Nearshore Tideflats, Tacoma., Washington

FROM: Joe Tieger, Regional Coordinator
CERCLA Enforcement Division

TO: Lee Marshall
Remedial Project Manager

The Record of Decision (ROD) for this site was signed on December 30, 1987. As a result of studies conducted subsequent to the ROD Region X has found it necessary to make a number of changes to the remedy selected in the ROD.

Briefly, these changes include:

1. The consolidation and stabilization of additional contaminated soils in the ROD cap area.

2. Consolidation and stabilization of soils from the Joseph Simon and Sons (Simon) East Area and the inclusion of these materials in the ROD cap area.

3. The importation of clean fill material to backfill excavated areas and to place treated tars, soils and auto-fluff above the seasonally high water table.

4. Modification of the stabilization mixtures for the chemical and physical properties of each type of contaminated material; tars, soils and auto-fluff.

5. The modification of leaching requirements and treatment levels to reflect consideration of the final Batch Demonstration Report, the final dilution and attenuation report, bench test data, and attenuation characteristics.

6. Increasing the volume of soils to be treated from approximately 45,000 cubic yards to 78,000 cubic yards.

7. Increasing the area to be covered with an impermeable cap

from 75,000 square yards to approximately 178,000 square yards. The capped area will now include all of the Simon operating area.

8. The capitol cost for the Remedial Action has increased from approximately $3.4 million to approximately $15-18 million.

9. The schedule for the Remedial Action now includes an additional year to allow for unforseen events or conditions.

None of these changes fundamentally change the nature of the remedy described in the ROD. As required by CERCLA 117 (c) and described in the ROD Guidance, a notice of the availability of this ESD as well as a brief description of it, should be published in a newspaper. This memorandum confirms and closes out the required consultation process. If there are any questions, please call me at FTS 398-8632.

cc. Nancy Briscoe, OERR